REMARKS

Claims 1-29 are rejected. Claims 1, 26, 27, and 28 have been amended. Claims 12 and 14 have been canceled. New claim 30 has been added. Claims 1-11, 13, and 15-30 are presently pending in the application. Favorable reconsideration of the application in view of the following remarks is respectfully requested.

The basis for the amendment of claims 1 and 28 is found in claims 12 and 14 as originally filed and pg 7 lines 18-28 of the specification as originally filed. The basis for the amendment of claims 26 and 27 is found on pg 12, lines 11-12 of the specification as originally filed. The basis for new claim 30 is original claims 1, 12, and 14 and pg. 26, lines 14-15 of the specification as originally filed.

Objections:

The status of the copending application cited on page 1 of the specification has been updated, as requested by the Examiner.

Claim 12, objected to because of the use of "nm" to express the unit of the aspect ratio, has been amended accordingly.

Rejection of Claims 1-29 under 35 USC § 112:

The Examiner has rejected Claims 1-29 under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention, as the language "(w)herein said layered material comprises less than 10 % by weight of said at least one layer" in claims 1, 28 is unclear because the 10 % weight depend on at least one layer, which is include a multiple layers, for example, in a situation wherein the material contains more than one layer, it is unclear whether the weight percent depend on one layer or a combination of layers or all of the layers of the material. Normal rules of claim construction indicate the relation ship. For example if "said at least one layer" is exactly one layer, the claim reads as follows: "(w)herein said layered material comprises less than 10 % by weight of said one layer". If "said at least one layer" is two layers, the claim reads as follows: "(w)herein said layered material comprises less than 10 % by weight of said two layers". By defining "said at least one layer", one of skill in the art would understand that the % weight is based on the number of splayant and layered material-containing layers.

The Examiner has rejected Claim 4, as it contains the language "such as ..." in "mixed function hardeners such as halogen- ..." is unclear as to whether to hardeners having function after "such as" are claimed or are exemplified. Claim 4 has been amended to clarify the hardeners.

The Examiner has rejected Claims 26-27 as unclear with respect to the language "(w)herein the Young's modulus of said support enhanced by at 1--t 10 %" ind "(w)herein the Young's modulus of said support enhanced by at least 20 %" is unclear with respect to the term "enhanced", and the percentage of 10 % and 20 % cannot be determined in the absence of providing the basis thereof. The Applicants have amended claims 26 and 27 to provide a point of reference. In addition, the language "enhanced by at least" has been allowed in multiple patent claims. See U.S. Pat. No. 6,773,918 , August 10, 2004 , (Claim 3... activation of the reporter gene is enhanced by at least 4- fold.), U.S. Pat. No. 6,766,767 , July 27, 2004 (Claim 6. wherein egg production is enhanced by at least 10%), U.S. Pat. No. 6,759,573 , July 6, 2004 (Claim 1.. explant, and wherein the stable transformation is enhanced by at least 0.5%; and b) identifying ..... Claim 2. wherein the stable transformation is enhanced by at least 10%. Claim 3. The method of ..... 1 wherein the stable transformation is enhanced by at least 5-fold.), U.S. Pat. No. 6,673,363 , January 6, 2004 (Claim 32.. local anesthetic agent is enhanced by at least about 1.5 fold. Claim 33.. local anesthetic agent is enhanced by at least about 3-fold.), U.S. Pat. No. 6,313,167 , November 6, 2001 (Claim 21: . anaerobic threshold value are enhanced by at least 3%. Claim 26.. anaerobic threshold value are enhanced by at least 3%.), U.S. Pat. No. 6,312,662 , November 6, 2001 (Claim 18... said oral bioavailability is enhanced by at least 100%.), U.S. Pat. No. 6,127,142 , October 3, 2000 (Claim 2... milk clotting activity is enhanced by at least 20%.), and U.S. Pat. No. 5,210,404 , May 11, 1993 (Claim 2... period is such that the sensitivity of the sensor is enhanced by at least 10%.)

Rejection of Claims 1-3, 5-23 and 26-29 Under 35 U.S.C. §102(e):

The Examiner has rejected Claims 1-3, 5-23 and 26-29 under 35 U.S.C. 102(e) as being anticipated by Rao et al (US Patent No. 6,667,148), as the applied reference the invention as claimed, a material comprising a support and a barrier layer containing material comprising inorganic filler comprising platelets of a phyllosilicate, the platelets having a length to thickness ratio of from about 20

to about 200 and being intercalated with one or more of a poly(vinyl alcohol), gelatin or a gelatin derivative, poly(ethylene oxide), or poly(vinyl pyrrolidone), the weight ratio of the platelets to the hydrophilic or water-dispersible polymer being from about 0.01:1 to about 0.1:1; the inorganic filler particle such platelets of layered material including smectite clays such as montmorillonite having grain size of 0.01 to 1 micron and preferred aspect ratio of 20 to 200; the inorganic filler particles which are intercalated or exfoliated with one or more hydrophilic polymer including gelatin; the addenda such as surfactants, lubricant, matting agent, cross-linking agent, hardener and dyes; the support material; the amount of inorganic filler particles in the barrier layer from 3 to 10 weight %, and therefore, Rao et al as a whole disclose the invention as claimed and the claimed invention lacks novelty.

Rao discloses thermally developable materials which include an imaging layer containing a non-photosensitive source of reducible silver ions. Disposed over the imaging layer is a barrier layer that comprises inorganic filler particles that are intercalated or exfoliated with a hydrophilic or water- dispersible polymer. The particles have a length to thickness ratio of from about 10 to about 1000. The barrier layer can prevent migration of diffusible imaging components and by-products resulting from high temperature imaging and/or development. These thermally developable materials include both thermographic and photothermographic materials.

The present invention relates to imaging elements having improved mechanical properties as a result of incorporation of a natural clay-containing layer. These imaging elements are characterized an imaging layer, and a support having at least one layer comprising a clay nanocomposite wherein said nanocomposite comprises a hydrophilic organic splayant and at least one layerd materialnatural clay particle having an aspect ratio of from 100:1 to 400:1 and a length greater than 0 and less than or equal to 700 nm (0.7μm).

A claim is anticipated under 102(e) only if each and every element as set forth in the claim is found, either expressly or inherently, in a single prior art reference. Verdegaal Bros. V. Union Oil Co. of California, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). Applicants have amended claim 1 to incorporate a layered material having an aspect ratio of from 100:1 to 400:1 and a length greater than 0 and less than or equal to 700 nm (0.7μm). Roa fails to

disclose a layered material having these characteristics. As a result, Rao fails to anticipate the present invention and the rejection should be withdrawn.

Also under 35 USC 102(e), a person shall be entitled to a patent unless the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent. When any claim of an application is rejected under 102(e), the inventor of the subject matter of the rejected claims may submit an appropriate oath or declaration to establish invention of the subject matter of the rejected claim prior to the effective date of the reference. The showing of facts shall be such, in character and weight, as to establish reduction to practice prior to the effective date of the reference, or conception of the invention prior to the effective date of the reference coupled with due diligence from prior to said date to a subsequent reduction to practice or to the filing of the application. Original exhibits of drawings or records, or photocopies thereof, must accompany and form part of the affidavit or declaration or their absence satisfactorily explained.

The Applicants have attached an appropriate Declaration under 37 CFR 1.131, including photocopies of original Exhibits A-F, establishing that the reduction to practice of the subject matter of Claims 1-29 occurred prior to the effective date of Jan. 14, 2003 of the reference to Rao. Therefore, the Applicants request that the Examiner reconsider and withdraw the rejection.

Rejection Of Claim 4 Under 35 U.S.C. §103(a):

The Examiner has rejected Claim 4 under 35 U.S.C. 103(a) as being unpatentable over Rao et al (US Patent No. 6,667,148) in view of the Applicants' disclosure on page 11 second paragraph or Taylor et al (US Patent No. 5,800,977), indicating that Rao et al suggest the use of hardener such as disclosed in the rejection above and it would have been obvious to the worker of ordinary skill in the art at the time the invention was made to use a hardener known in the art such as disclosed in the applicants'diclosure or Taylor et al to increase the hardening rate of hydrophilic colloid taught in Rao el al, and thereby provide an invention as claimed.

Rao discloses thermally developable materials which include an imaging layer containing a non-photosensitive source of reducible silver ions. Disposed over the imaging layer is a barrier layer that comprises inorganic filler particles that are intercalated or exfoliated with a hydrophilic or water- dispersible polymer. The particles have a length to thickness ratio of from about 10 to about 1000. The barrier layer can prevent migration of diffusible imaging components and by-products resulting from high temperature imaging and/or development. These thermally developable materials include both thermographic and photothermographic materials.

Taylor discloses a hydrophilic colloid hardened with a vinyl-sulfone hardener in the presence of a borate compound in an amount sufficient to accelerate the rate of hardening.

The present invention relates to imaging elements having improved mechanical properties as a result of incorporation of a natural clay-containing layer. These imaging elements are characterized an imaging layer, and a support having at least one layer comprising a clay nanocomposite wherein said nanocomposite comprises a splayant and at least one layered material having an aspect ratio of from 100:1 to 400:1 and a length greater than 0 and less than or equal to 700 nm (0.7μm).

To establish a prima facia case of obviousness requires, first, there must be some suggestion or motivation, either in the references themselves, or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art references (or references when combines) must teach or suggest all the claim limitations.

Rao fails to disclose the layered materials as presently claimed. There is no disclosure of layered material, especially natural clays having an aspect ratio of from 100:1 to 400:1 and a length greater than 0 and less than or equal to 700 nm (0.7μm). Rao also fails to mention the specific problems related to curl, cationic exchange capacity and humidity expansion, providing no motivation to make the presently claimed selection. Although Rao generally refers to layered materials that include the materials of the invention, there is no disclosure that the subset presently claimed would have any special properties not demonstrated by the broader range of materials disclosed in Rao. Therefore, Rao

provides no likelihood of success relating to the presently claimed materials. Also, by failing to specifically refer to layered materials having an aspect ratio of from 100:1 to 400:1 and a length greater than 0 and less than or equal to 700 nm (0.7μm), Rao fails to teach or disclose every element of the present claims.

In addition, the claimed subset provides surprising results over the materials of Rao. Rao discloses both Laponite materials and Cloisite materials. See col. 9, line 18 - col. 10, line 25 (listing of useful clay materials, including both Laponite and Cloisite), Table V, col. 40, line 48 – col. 41, line 17 (indicating Laponite and Cloisite as inventive examples). The present examples (pg. 26, line 14 – pg. 27, line 6, Tables 1 and 2) utilize laponite as a control example. The inventive Laponite materials of Rao and the control examples of the present invention are the same material. The Cloisite materials of the present invention, having an aspect ration of 200:1 (Table 1, pg. 26), provide improved results as compared to the Laponite material, having an aspect ratio of 20-30:1 (Table 1, pg. 26), with respect to cationic exchange capacity (Table 1, pg. 26), humicity expansion (Table 2, pg. 28), and humidity curl (Table 3, pg. 29).

Therefore, Rao alone fails to teach, suggest or disclose the presently claimed invention or the improvements achieved with use of the present invention, fails to provide any likelihood that the presently claimed layered materials would provide these benefits, fails to teach the elements of the present claims, and, in the light of the surprising improvement achieved with the selection of layered materials having an aspect ratio of from 100:1 to 400:1 and a length greater than 0 and less than or equal to 700 nm (0.7μm), from the variety of layered materials disclosed by Rao, the present invention is not obvious over the reference to Rao alone.

Rao fails to disclose, teach or suggest the use of a hardening agent as an organic splayant, while Taylor makes no mention of either splaying, that is, intercalating or exfoliating or the use of hardening agents as exfoliants / intercalants / splayants. Further, neither reference indicates that the use of hardening agents as splayants produces materials with reduced curl, cationic exchange capacity, and reduced humidity expansion. Since neither Rao nor Taylor teach a hardening agent used as a splayant, there can be no motivation to modify the references to provide a hardening agent used as a splayant and the references also fail to disclose each and every element of the claims. In the

absence of any disclosure indicating that a hardening agent may be used as a splayant, the references fail to produce any likelihood of success.

Rejection Of Claim 4 Under 35 U.S.C. §103(a):

The Examiner has rejected Claim 4 under 35 U.S.C. 103(a) as being unpatentable over Rao et al (US Patent No. 6,667,148) in view of the Eichorst et al (US Patent No. 6,300,049), indicating that Eichorst et al discloses to provide an imaging layer a layer having dry weight coverage of 2 to 2000 mg/m2 and it would have been obvious to the worker of ordinary skill in the art at the time the invention was made to provide an layer taught in Rao et al with a known dry thickness taught in Eichorst et al with a expectation of achieving a functional layer, and thereby provide an invention as claimed.

The Applicants has been unable to locate language relating to dry weight coverage in claim 4 and are assuming the claim at issue is claim 25. As discussed above, the Applicants believe that, as Rao alone fails to teach, suggest or disclose the presently claimed invention or the improvements achieved with use of the present invention, fails to provide any likelihood that the presently claimed layered materials would provide these benefits, fails to teach the elements of the present claims, and, in the light of the surprising improvement achieved with the selection of layered materials having an aspect ratio of from 100:1 to 400:1 and a length greater than 0 and less than or equal to 700 nm (0.7μm), from the variety of layered materials disclosed by Rao, the present invention is not obvious over the reference to Rao alone.

Eichorst relates to an imaging element including a support, at least one image forming layer superposed on the support, at least one transparent magnetic recording layer superposed on the support, and an electrically-conductive layer superposed on the support, which electrically-conductive layer may include a sulfonated polyurethane film- forming binder and at least one metal antimonate particle. Eichorst fails to teach or disclose layered materials having an aspect ratio of from 100:1 to 400:1 and a length greater than 0 and less than or equal to 700 nm (0.7μm), and the benefits relating to cationic exchange capacity, humidity expansion, and curl.

Like Rao, Eichorst fails to teach or disclose layered materials having an aspect ratio of from 100:1 to 400:1 and a length greater than 0 and less than or equal to 700 nm (0.7μm), and the benefits relating to cationic exchange

capacity, humidity expansion, and curl. Neither Eichorst nor Rao provide a motivation to modify the references to produce the present claims. Neither do the references disclose, teach or suggest all the limitations of the claims. Eichorst also discloses both Laponite, as a preferred material, and a broad range of other layered materials (co. 12, line 46 – col 13, line10) and indicates that preferred aspect ratios are in the range of 10:1 and 5:1. Eichorst provides no likelihood of success, only a motivation to try a broad range of materials - the aspect ratio of 20-30:1 (Laponite of Rao, specifically mentioned in Eichorst as preferred) serves as the control in the examples of the present invention.

Rejection Of Claims 1-3, 5-29 Under 35 U.S.C. §103(a):

The Examiner has rejected Claims 1-3, 5-29 as being unpatentable over the combination of Christian et al (US Patent No. 6,060,230) and Beall et al (US Patent 5,552,469), as Christian et al discloses a support and an electrically conductive layer containing intercalated materials, including smectite particles, a dry thickness of 0.01 to 2 g/m2, and the size of particle is from 0.005 micron to 0.05 micron, the polymeric binder that are capable of sufficiently intercalating inside or exfoliating smectite particles including water soluble polymer including hydrophilic colloid such as gelatin, the basal spacing of 50 % or more as the clay to binder weight ratio changed from 100:0 to 30:70, the support, and the 8.3 weight % of clay. While, Christian et al fails to disclose the size of the smectite particle having aspect ratio of 20:1 to 500:1 presented in the claimed invention, Beall et al disclose the platelets have an aspect ratio of about 200 to 2,000, and, therefore, it would have been obvious to the worker of ordinary skill in the art at the time the invention was made to use the swellable clay within having size taught in Beall et al with an expectation of achieving a material exhibiting excellent dry and wet adhesion, and thereby provide a material and process as claimed.

Christian discloses an imaging element which includes a support, an image-forming layer superposed on the support, a transparent magnetic recording layer superposed on the support; and an electrically-conductive layer superposed on the support. The transparent magnetic recording layer is composed of magnetic particles dispersed in a first film-forming polymeric binder. The electrically- conductive layer includes electrically-conductive metal-containing colloidal particles, swellable, smectite clay particles, a first polymeric binder

which can sufficiently intercalate inside or exfoliate the smectite clay particles and a second film forming polymeric binder, wherein the electrically-conductive metal-containing particles and the polymer-intercalated or polymer-exfoliated smectite clay particles are dispersed for use in photographic and thermally-processable imaging elements.

Beall relates to exfoliated layered silicate material derived from intercalates formed by contacting the layer material, e.g., a phyllosilicate, with an intercalant polymer to sorb or intercalate the polymer between adjacent platelets of the layered material, so that the intercalate easily can be exfoliated to provide a matrix polymer/platelet nanocomposite material useful wherever polymer/filler composite materials are used, for example, as external body parts for the automotive industry; heat-resistant polymeric automotive parts in contact with an engine block; tire cord for radial tires; food wrap having improved gas impermeability; electrical components; food grade drink containers; and any other use where it is desired to alter one or more physical properties of a matrix polymer, such as elasticity and temperature characteristics, e.g., glass transition temperature and high temperature resistance.

The present invention relates to imaging elements having improved mechanical properties as a result of incorporation of a layered material layer or a natural clay-containing layer. These imaging elements are characterized by a support, an imaging layer, and at least one layer comprising a clay nanocomposite wherein said nanocomposite comprises a splayant and at least one layered material natural clay particle having an aspect ratio of from 100:1 to 400:1 and a length greater than 0 and less than or equal to 700 nm (0.7μm).

To establish a prima facia case of obviousness requires, first, there must be some suggestion or motivation, either in the references themselves, or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art references (or references when combines) must teach or suggest all the claim limitations. As indicated by the Examiner, Christion discloses no aspect ratio of clay. Christian also fail to teach or disclose the length of the layered material, and fails to mention the benefits of cationic exchange capacity, humidity expansion, and curl obtained with the selection of the present claims. Beall fails to mention the particular aspect ration

presently claimed in combination with a particular length and also fails to teach or disclose the use of the intercalated layered materials in imaging elements to achieve properties critical to the acceptability of the element, particularly the properties of cationic exchange capacity, humidity expansion, and curl. There is no motivation in either reference to select the particulary claimed layered material to produce an imaging element. Bother references also disclose a broad range of layered materials. Given the broad range of materials, the references provide no likelihood that the specific slection of the present claims would produce an imaging element having improved cationic exchange capacity, humidity expansion, and curl. The references simply provide a list of materials to try with no improvement goal in mind. Finally, neither reference discloses all the limitations of the present claims, that is, a clay nanocomposite wherein said nanocomposite comprises a splayant and at least one layered material natural clay particle having an aspect ratio of from 100:1 to 400:1 and a length greater than 0 and less than or equal to 700 nm (0.7μm). As discussed above, the present selection has provided surprising results relating to cationic exchange capacity, humidity expansion, and curl when utilized in an imaging element, as compared to other materials disclosed in the references.

Rejection Of Claim 4 Under 35 U.S.C. §103(a):

The Examiner has rejected Claim 4 under 35 U.S.C. 103(a) as being unpatentable over Christian et al (US Patent No. 6,060,230) and Beall et al (US Patent 5,552,469) in view of the Applicants' disclosure on page 11 second paragraph or Taylor et al (US Patent No. 5,800,977), as the hardening agents for hydrophilic colloid has been known in the art such as disclosed in the present specification disclosure and Taylor et al and it would have been obvious to the worker of ordinary skill in the art at the time the invention was made to use a hardener known in the art such as disclosed in the applicants'diclosure or Taylor et al to increase the hardening rate of hydrophilic colloid taught in Christian et al, and thereby provide an invention as claimed.

To establish a prima facia case of obviousness requires, first, there must be some suggestion or motivation, either in the references themselves, or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable

expectation of success. Finally, the prior art references (or references when combines) must teach or suggest all the claim limitations.

As discussed above, Taylor discloses a hydrophilic colloid hardened with a vinyl-sulfone hardener in the presence of a borate compound in an amount sufficient to accelerate the rate of hardening. The addition of Taylor to the combination of references Beall and Christian discussed immediately above would only provide the additional element of a hardener in combination with the layer, not as a splayant as presently claimed. No combination of the references produces an imaging element comprising a support with a layer containing an organic hardening agent splayant or a hydrophilic colloid splayant and a layered material splayed by the splayant, wherein the layered material has an aspect ratio from 100:1 to 400:1, a length greater than 0 and less than or equal to 700 nm (0.7μm), and comprises less than 10% by weight of the layer. Therefore the combination of Taylor, Beall and Christian also fails to make the present claims obvious.

It is believed that the foregoing is a complete response to the Office Action and that the claims are in condition for allowance. Favorable reconsideration and early passage to issue is therefore earnestly solicited.

Respectfully submitted,

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